

WHAT IS CLAIMED IS:

1. A miniature analytical device with thermal regulation comprising:  
a localized heat source; and  
a first array of temperature-controlled zones comprising reactants,  
wherein said localized heat source regulates temperature in said  
zones.
2. A miniature analytical device with thermal regulation according to claim  
1, wherein:  
said localized heat source comprising a second array of  
electromagnetic radiation emitters, wherein a second array of  
electromagnetic radiation emitters is positioned to correspond with  
said first array of temperature-controlled zones.
3. A miniature analytical device with thermal regulation according to claim  
2, wherein:  
said second array of electromagnetic radiation emitters comprising  
vertical cavity surface emitting laser light sources.
4. A miniature analytical device with thermal regulation according to claim  
3, wherein:  
said second array of electromagnetic radiation emitters transmits  
infrared light through the reactants to measure the concentration of a  
material within said reactants.
5. A miniature analytical device with thermal regulation according to claim  
3, wherein:  
said second array of electromagnetic radiation emitters transmits

infrared light through the reactants to measure the temperature of the reactants.

6. A miniature analytical device with thermal regulation according to claim 1, wherein:

said second array of electromagnetic radiation emitters comprises with at least one light source chosen from a vertical cavity surface emitting laser light source, a light emitting diode, an infrared lamp, an infrared laser, and an infrared diode laser, said first array positioned to correspond with said second array.

7. A miniature analytical device with thermal regulation according to claim 6, wherein:

at least one of said light source in said second array generates infrared light of a different wavelength.

8. A miniature analytical device with thermal regulation according to claim 6, wherein:

said light sources generate infrared light with a wavelength of at least 0.775 micrometers.

9. A miniature analytical device with thermal regulation according to claim 6, wherein:

said light sources generate infrared light with a wavelength of at most 7000 micrometers.

10. A miniature analytical device with thermal regulation according to claim 1, wherein:

said localized heat source comprises a second array of internal heat

generators, wherein said second array of internal heat generators is positioned within said first array of temperature-controlled zones.

11. A miniature analytical device with thermal regulation according to claim 10, wherein:

said internal heat generators comprise of at least one electrical heater chosen from resistive heaters, inductive heaters, and Peltier heaters.

12. A miniature analytical device with thermal regulation according to claim 11, further comprising:

a third array of electrical leads positioned to correspond with said second array of internal heat generators.

13. A miniature analytical device with thermal regulation according to claim 1, wherein:

said localized heat source comprises a second array of external heaters, wherein said second array of external heaters is positioned to correspond with said first array of temperature-controlled zones.

14. A miniature analytical device with thermal regulation according to claim 1, further comprising:

a power supply coupled to said localized heat source providing sufficient drive current to increase the temperature of said temperature-controlled zones.

15. A miniature analytical device with thermal regulation according to claim 14, further comprising:

a controller coupled to said power supply for controlling the drive current to said localized heat sources.

16. A miniature analytical device with thermal regulation according to claim 15, wherein:

said controller modulates the power supply based on a temperature measured from the temperature-controlled zones.

17. A miniature analytical device with thermal regulation according to claim 1, further comprising:

a third array of temperature monitors, said third array positioned to correspond to said first array of temperature-controlled zones.

18. A miniature analytical device with thermal regulation according to claim 1, wherein:

said reactants comprise assay elements for body fluid analysis.

19. A method of thermal regulation for a miniature analytical device comprising:

heating a first array of temperature-controlled zones containing reactants with a localized heat source;

measuring the temperature of said temperature-controlled zones;

modulating said localized heat source; and

regulating the temperature of said temperature-controlled zones.

20. A method of thermal regulation for a miniature analytical device according to claim 19, further comprising:

modifying at least one absorptive property of said reactants.